

**HATCHERY EVALUATION REPORT**  
**RAPID RIVER HATCHERY - SPRING CHINOOK**

**An Independent Audit Based on Integrated Hatchery Operations Team  
(IHOT) Performance Measures**

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## **Executive Summary**

This report presents the findings of the independent audit of the Rapid River Hatchery (Spring Chinook). The hatchery is located in the lower Snake River basin near Riggins Idaho. The hatchery is used for adult collection, egg incubation, and rearing of spring chinook.

The audit was conducted in April 1996 as part of a two-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

### **Background**

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

## **The Audit Process**

The audit was based on the facility management's response to a 98-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters sources
- The hatchery manager was asked to fill out and return the audit form
- A 1-2 day site audit inspection visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

## **Rapid River Hatchery (Spring Chinook) Results**

The Rapid River facility includes three ponds for adult holding, 12 concrete raceways, 2 rearing ponds, and incubation facilities. The hatchery was constructed in 1964 to mitigate for fish losses caused by construction of hydroelectric facilities on the Snake River in Hells Canyon.

The hatchery was in general compliance with most of the performance measures. In the area of program objectives, the hatchery did not have a Monitoring and Evaluation Plan in place. The audit found that the hatchery was not in compliance with the screen approach criteria, adult holding facilities, turbidity criteria, and pathology-free water criteria, which are all facilities requirements. The hatchery also slightly exceeds its flow and density criteria for rearing. In the compliance area for fish health policy, the hatchery did not meet the criteria of routine hatchery visits every month. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Rapid River Hatchery (Spring Chinook Program) requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in order of occurrence on the questionnaire without intent of ranking or otherwise assigning priority:

- Prepare hatchery monitoring and evaluation plan
- Improvements to adult holding and crowding systems
- Review water temperature criteria
- Rebuild intake to meet current criteria and replace piping to increase flow to Pond #2
- Increase water rights for hatchery
- Run analysis for carbon dioxide, iron and zinc
- Improve coordination with NMFS to reduce delays in release due to ESA permit issues
- Iron and zinc concentrations are greater than the criteria

- Water treatment for incubation and early rearing
- Development of groundwater supply for incubation and early rearing
- Provide early rearing tanks for full program and additional building space
- Modify raceways to allow draining, drying, and disinfection
- Install backup generator for feed freezer
- Regional quality control officer to evaluate feeds
- Develop specific rearing criteria for feeding training in outdoor raceways
- Flow and density criteria slightly over standards during some time of year. Could require more rearing space and water flow, but should be studied carefully.
- Construction of acclimation pond at existing release site (Hells Canyon) or new acclimation/release site
- Development of smoltification goal
- Increase in frequency of routine fish health examinations
- Install foot baths
- Volitional release in fall
- Disinfection of fish transport cab
- Reduction of DO to 8 ppm in transport after systems are functioning properly
- Better communication between research group and hatchery; may need additional personnel
- Develop genetics monitoring and evaluation plan

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 2, Section 4) were not listed above.

## Facility Description

**Name:** Rapid River Hatchery  
**Stock/Species:** Spring Chinook  
**Operating Agency:** Idaho Department of Fish and Game  
**Funding Agency:** Idaho Power Company  
**Location:** Rapid River Hatchery is located along the Rapid River in the lower Snake River Basin near Riggins, Idaho. It is approximately 606 river miles from the mouth of the Columbia River at an elevation of 2,185 feet above sea level.  
**Address:** Rapid River Hatchery  
Idaho Department of Fish and Game  
H.C. 69, Box 85  
Riggins, ID 83549-9702  
**Hatchery Manager:** Rick Lowell  
**Phone:** (208) 628-3277  
**Fax:** (208) 628-3798  
**Purpose:** Rapid River Hatchery was constructed in 1964 to mitigate for fish losses caused by Idaho Power Company's construction of hydroelectric dams on the Snake River in Hells Canyon.  
The hatchery is used for adult collection, egg incubation, and rearing of spring chinook. This hatchery provides fish for ocean and river fisheries and provides surplus eggs to other hatchery programs in the



<b>Production Goal:</b>	basin.
	2.5 million smolts @20/lb for on-station release
	0.5 million smolts @20/lb for release into the Snake River below Hells Canyon Dam
<b>Water Supply:</b>	Provide surplus eggs to other hatchery programs in the basin
	Water is supplied to the hatchery from Rapid River. All water is gravity flow with the hatchery receiving 12,567 gpm and the trap receiving 8,348 gpm.
<b>Facilities:</b>	Separate river intakes provide for incubation and rearing.
Incubation:	50, 16-stack vertical trays
Adult Holding:	Pond #1 (8,000 cf)
	Pond #2 (24,000 cf)
	Pond #3 (40,000 cf) - no longer used
Raceways:	12 concrete raceways (22,680 cf total)
Rearing Ponds:	Pond #1 (157,000 cf)
	Pond #2 (82,000 cf)
Satellite Facilities:	None

## Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report). The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audited included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 98 page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Section 7 includes general information needed for the audit:

- Section 1      Performance Measures for Program Objectives (PMs 1-4)
- Section 2      Performance Measures for Facility Requirements (PMs 5-15)

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Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 3	Performance Measures for Hatchery Practices (PMs 16-25)
Section 4	Performance Measures for Fish Health Policy (PMs 26-34)
Section 5	Performance Measures for Ecological Interactions (PMs 35-38)
Section 6	Performance Measures for Genetics Policy (PMs 39-43)
Section 7	Performance Measures for General Information (PMs General 1-2)

Several performance measures are repeated in various sections of the audit. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by light gray shading.

## The Hatchery Audit Process

The hatchery audit will be conducted over a two-year period that concludes in 1997. This report covers phase one of the audit, which consists of an audit of four hatcheries and seven species or stocks of fish. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and on-site visits. The site visits were conducted from March 4 to March 8.

The following is the five step audit process:

1. Information was obtained from headquarters sources.
2. The hatchery manager was asked to fill out and return the **Audit Form**.
3. A 1-2 day site audit inspection visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. A **Compliance Report** was developed to document the compliance status of each performance measure. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative.
5. This information was used to develop a draft **Hatchery Evaluation Report**. Based on review and comments of this prototype document, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

## **Compliance Status of Rapid River Hatchery (Spring Chinook)**

This section documents the compliance status of the Rapid River Hatchery (Spring Chinook). Each performance measure is presented in a table taken from the audit form (Table 1). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4, where the cost of the required remedial actions is also presented.



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan + Idaho Power agreement	
#2	Is the hatchery operating under a current hatchery operational plan?  Is it understood by staff?  Is it being followed?		4  4  4			IHOT + Rapid River Hatchery Plan  Discussion/Review of plan  Discussion/Review of plan	
#3	Is a hatchery monitoring and evaluation plan in place?				4	Monitoring information supplied; no written plan supplied to team	Prepare plan for IHOT Operations Plan

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#4	<b>Specific performance measures include:</b>						
#4a	<b>Adult contribution to fisheries, spawning grounds and hatchery</b>		4			Information supplied	
#4b	<b>Adult pre-spawning survival as compared with established goal</b>				4	2 out of 5 years in compliance	Need improvements to adult holding & crowding systems
#4c	<b>Egg-take as compared with established hatchery goal</b>				4	2 out of 5 years in compliance	Need better adult returns
#4d	<b>Green-egg-to-eyed-egg survival as compared with established goal</b>		4			Review of records	
#4e	<b>Eyed-egg to fry survival as compared with established goal</b>		4			No goal listed in IHOT	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#4f	<b>Fry-to-smolt survival as compared with established goal</b>		4			Review of records	
#4g	<b>Production as compared with established goal</b>				4	4 out of 5 years in compliance	Need better adult returns
#4h	<b>Percent survival (smolt to adult) as compared with established goal</b>				4	0 out of 5 years in compliance	Need better adult returns
#4i	<b>Number of eggs, fry, fingerlings, smolts and/or adults to meet basinwide needs</b>	4					



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5	Water quality						
#5a	<p><b>Temperature</b></p> <p>Do your water temperatures meet the criteria for spawning?</p> <p>Do your water temperatures meet the criteria for incubation?</p> <p>Do your water temperatures meet the criteria for rearing?</p>		4		<p></p> <p>4</p> <p>4</p>	<p>Review of records</p> <p>Daily average temperatures drops below criteria</p> <p>Daily average temperatures drops below criteria</p>	<p></p> <p>Review IHOT temperature criteria and consider develop of wells for incubation</p> <p>Review IHOT temperature criteria</p>

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#5b	<b>Dissolved gases</b>						
	Is the oxygen level near saturation?		4			Review of records	
	Is the dissolved nitrogen level less than saturation?		4			Review of records	
#5c	<b>Chemistry</b>						
	Ammonia (un-ionized)		4	4		No data	Run analysis
	Carbon Dioxide		4				
	Chlorine		4				
	pH		4				
	Copper		4				
	Hydrogen Sulfide				4		Unknown
	Iron				4		Unknown
	Zinc						

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#5d	<b>Turbidity</b>  Does your turbidity meet the criteria?				4	Exceeds turbidity criteria at high flows	Water treatment for incubation & early rearing
#5e	<b>Alkalinity and hardness</b>  Does your alkalinity and hardness meet the criteria?		4			Review of water analysis records	
#5f	<b>Nitrite</b>  Does your nitrite meet the criteria?		4			Review of water analysis records	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#5g	<b>Contaminants</b>					Review of water analysis records	
	Aldrin		4				
	Endrin		4				
	Dieldrin		4				
	Heptachlor		4				
	Chlordane		4				
	Methoxychlor		4				
	Lindane		4				
	Malathion		4				
	Guthion		4				

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#5h	<b>Pathogens</b>						
	What portions of the hatchery have disease-free water?						
	Adult holding?				4		
	Incubation?				4		
	Early rearing?				4		
	Rearing?				4		
	Others?		4			Well water used for water hardening of eggs	Hatchery has lived with present conditions. A disease-free water supply would be useful for incubation and early rearing. Can not use groundwater directly because of temperature impacts on development

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#6	<b>Alarm Systems</b>						
	Do the following areas have alarms?						
	Intake?		4			Inspection Discussion	
	Large rearing ponds and adult holding ponds?		4			Ò	
	Raceway headboxes and rearing ponds?		4			Ò	
	Incubation facilities?	4					
	Quarantine areas and facilities?	4					
	Water treatment systems?				4		
	Security?		4				
	Are there outside systems and buzzers in on-site residences?		4				
	Are water flow alarms checked daily?		4				
							Hatchery staff lives on station; enforcement staff live at adult collection site during run. Security has never been a major problem.

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#7	<b>Adult collection and holding facilities</b>  Do you meet the adult holding criteria?				4	Review of records; adult pre-spawning mortality exceeds criteria	Need to improve adult holding facilities and install crowders
#8	<b>Incubation facilities</b>  Type 1: Vertical Stacks  Do you have an adequate number of units for the overall program?		4			Review of records/inspection	Current water supply has excessive sediment load during high-flows and is not disease-free. Need some type of water treatment for incubation and early rearing

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#9	<b>Rearing facilities</b>  Type 1: Early rearing troughs Do you have an adequate number of units for the overall program?  Type 2: Raceways Do you have an adequate number of units for the overall program?  Type 3: Ponds Do you have an adequate number of units for the overall program?						
					4	Inspection/Discussion	Would need more for full program and expanded incubation building
			4			Inspection/Discussion	Modification to allow draining, drying, and disinfection of raceways
			4			Inspection/Discussion	FI exceeded at end of production cycle; need larger water rights, larger intake, and larger pipes



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#10	<b>Screening facilities</b>  Do you meet the approach velocity criteria:  Are the fish screens regularly cleaned?  Are rearing containers double screened for fish that should not be released to adjacent water?	4	4		4	Inspection/Discussion  Inspection/Discussion  Inspection/Discussion	The intake needs to be rebuilt to meet approach criteria and reduce sediment movement into water supply
#11	<b>Predator control facilities</b>  Are your predation control facilities effective?		4			Inspection/Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No	
#12	<p><b>Food storage facilities and quality control</b></p> <p>Does the storage of dry/semi-moist/moist foods follow food manufacturer's recommendations? (dry&lt;12%; semi-moist 12-20%; moist &gt;20% moisture)</p> <p>Does a regional quality control officer oversee production procedures and monitor:</p> <p>Verification by feed manufacturer that ingredients meet specifications?</p> <p>Ensure feeds do not contain unwanted drugs or other additives?</p> <p>Analyze ingredients contained in the final</p>					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
					4	In compliance except during power outages	Need backup generator for feed freezer
					4	Idaho Power buys feed	Unknown
					4	Idaho Power buys feed	Unknown

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#13	<b>Release facilities</b>  Do the release facilities ensure that fish are not subjected to adverse conditions?		4			Based on personal observation of hatchery staff	
#14	<b>Pollution abatement facilities</b>  Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?  Are pollution abatement facilities operated correctly?		4  4			Inspection/Discussion  Inspection/Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#15	<b>Transportation facilities</b>						
	Are the transport systems adequate to meet IHOT performance measures for transportation practices?		4			Inspection/Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	<b>Broodstock selection practices</b>						
	Is the donor selection process document attached?	4				Not a new program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock?	4				Not a new program; does not apply	
	Go to PM #40 in Genetics						

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#17	<b>Spawning practices</b>  Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?  Go to PM #42 in Genetics Section		4			Reviewed protocols and hatchery records	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#18	<b>Incubation practices</b>						
	Are specific incubation standards listed in the hatchery operations plan?		4			In Rapid River Operational Plan	Include in IHOT Operational Plan
	Are incubation practices written?		4			In Rapid River Operational Plan	
	Incubation Type 1: Vertical Tray See PM #8)		4			Review standards	
	Do you meet the loading and flow criteria?						



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No	
#19	<b>Rearing practices</b>					
	Are specific rearing standards listed in the hatchery operations plan?					
	Are rearing practices written?					
	Rearing Unit Type 1: Tanks(see PM 9)					
	Do you meet the density and DI criteria?					
	Do you meet the Loading and FI criteria?					
	Rearing Unit Type 2: Raceways (see PM 9)					
	Do you meet the density and DI criteria?					
	Do you meet the Loading and FI criteria?					
	Rearing Unit Type 3: Ponds (see PM 9)					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
			4			In Rapid River Operational Plan	Include in IHOT Operational Plan
			4			In Rapid River Operational Plan	
				4		This is the first year that the hatchery has used early rearing tanks	
				4			
						Fish crowded for feeding training	Develop specific rearing criteria
					4	Mean = 0.34; goal =0.30	for feeding training in outdoor
					4	Mean = 1.34; goal =1.20	raceways

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#20	<b>Smolt quality</b>						
	Do you produce a high quality smolt?		4			Examined by fish health specialist prior to release; personal observation of hatchery staff	

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No	
#21	<b>Fish health management practices</b>  Are the monthly hatchery monitoring visits being conducted? (PM #26)  Are the annual broodstock inspections being conducted? (PM #27)  Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)  Are the following water quality parameters within criteria? (PM #5a-5h)  Water temperature Dissolved gases					

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No		
			4		4	Comes only every 6 weeks	More frequent trips
						Review of records	
			4		4	Inspection/Discussion	Development of groundwater for early rearing; installation of footbaths
						Review of records/Discussion Review of records/Discussion	May not be significant
				4	4	No carbon dioxide; Fe & Zn >	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#22a	<b>Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas:</b>						
#22a1	<b>Percent smoltification</b>						
	Do you measure percent smoltification?		4			Fish health specialist measures percent smoltification; hatchery staff observe fish	
	Did you meet the smoltification criteria?	4				No goal found	Develop goal

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#22a2	<b>Rearing density (prior to release)</b>  Did you meet the rearing density criteria just prior to release?		4			Review of records	
#22a3	<b>Disease condition (at release)</b>  Did you meet all disease regulations just prior to release?		4			Pre-release inspection by fish health specialist	
#22a4	<b>Number (at release)</b>  Did you meet the release number goal?				4	1 out of last 2 years in compliance	Need better adult returns
#22a5	<b>Size at release</b>  Did you meet the size goal?		4			Review of records	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#22a6	<b>Dates of release</b>  Did you meet the release date goal?				4	Release delayed in some years due to ESA permit process	Improve coordination with NMFS to reduce delays in release due to ESA permit issues
#22a7	<b>Location of release</b>  Did you the release the fish at the specified location?		4			Review of records	



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#22b	<p><b>Are fish reared in the subbasin or acclimated in the subbasin?</b></p> <p>Are the fish reared in the subbasin?</p> <p>Are the fish acclimated in the subbasin? (Hells Canyon releases)</p>		4		4	<p>Discussion</p> <p>Hells Canyon releases not acclimated</p>	Construction of acclimation pond at existing release site or new acclimation/release site
#22c	<p><b>Is the release strategy appropriate for the program?</b></p>		4			Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No	
#23	<p><b>Transportation facilities</b></p> <p>Do transportation equipment and personnel receive disinfection before and after use?</p> <p>Disinfection of fish tank interior using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?</p> <p>Disinfection of fish transport vehicle exterior using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?</p> <p>Disinfection of fish transport vehicle (cab)</p>					

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No		
			4			Discussion with hatchery and Idaho Power staff	
			4			Ò Ò	
			4				

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

#23	<b>Transportation facilities</b>
(cont)	
	Does a pre-loading inspection covering the following: tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading the fish in the transport unit?
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading occur?
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained approximately 8 ppm?
	Is water temperature in the transportation unit maintained within 42-48°F range?

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		4				
			4		Discussion with hatchery and Idaho Power staff	Need to do this
		4			Uncertain if this is done	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

#24	<p><b>Evaluation practices</b></p> <p>Has the hatchery conducted fishery contribution studies to:</p> <p>Determine the requirements for evaluating and improving management programs?</p> <p>Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?</p> <p>Develop guidelines that define if the proper stocks of fish are currently being used?</p> <p>Determine which management units</p>
-----	--

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

			4		Research group does fisheries contribution studies	Need better communication between research and hatchery staff; may need additional personnel
			4		Ò	Ò
			4		Ò	Ò

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

#25	<p><b>Training practices</b></p> <p>Does the hatchery have a training schedule for its staff?</p> <p>Does each staff member have a personal training plan approved by a supervisor and reviewed annually?</p> <p>Does the hatchery routinely exchange training details between other hatcheries and agencies?</p> <p>Does the hatchery encourage and reward off-duty training of staff?</p> <p>Does the hatchery conduct monthly staff meetings?</p>
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**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		4			Discussion	
		4			Discussion	
		4			Discussion	
		4			Discussion	
		4			Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist?				4	Comes only every 6 weeks	More frequent trips
#27	Are all of the functions of the hatchery yearly monitoring visits being completed as described below?		4			Review of records	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#28	<p><b>Is the hatchery following accepted sanitation procedures?</b></p> <p>Are there any sources of pathogen-free water, especially for incubation and early rearing?</p> <p>Are the hatchery sanitation procedures understood and being followed?</p>						
					4	Inspection/Discussion	Development of groundwater for incubation & early rearing
					4	Inspection/Discussion	Install footbaths

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

[illegible]

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#30	<p><b>Are incubation and rearing standards being followed?</b></p> <p>Are the incubation practices being following the IHOT incubation criteria? (PM #18)</p> <p>Are the rearing practices following the IHOT criteria? (see PM #19)</p> <p>Go to Rearing practices, PM #18-PM #19</p>		4		4	<p>Inspection/Discussion</p> <p>Density and flow exceeds criteria at times</p>	Not thought to be a major problem by hatchery staff
#31	<p><b>Are egg and fish transfer/release requirements met?</b></p>		4			Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	<b>Is the hatchery's program outlined in a subbasin management plan?</b>  Go to subbasin plan, PM # 1		4			Columbia Basin System Planning Production Plan + Idaho Power agreement	
#33	<b>Is the hatchery operating under a current hatchery operational plan?</b>  Go to operational plan, PM # 2		4			IHOT + Rapid River Operational Plan	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#34	<b>Is a hatchery monitoring and evaluation plan in place?</b>  Go to hatchery monitoring and evaluation plan PM # 3				4	Monitoring Information supplied; no written plan to team	Develop plan for IHOT Operational Plan

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#35	<p><b>Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols.</b></p> <p>Does the hatchery program meet the requirements for the following: (PM #1-PM #2)</p> <p>Species protocols? (PM #4a)</p> <p>Stock protocols? (PM #4a)</p>						
			4			Review of plans	
			4			Discussion	
			4			Discussion	
						Discussion	



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#36	<p><b>Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location at release.</b></p>						
	Percent smoltification (PM #22a1)	4				No goal	
	Rearing density (PM #22a2)		4			Review of records/Discussion	
	Disease condition (PM #22a3)		4			Review of records/Discussion	
	Number at release (PM #22a4)				4	1 out of last 2 years in compliance	Need better returns

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
#37	<b>Are fish reared in the subbasin or acclimated in the subbasin?</b>  Rapid River releases  Hells Canyon releases  See PM #22b		4		4	Discussion  Discussion	Construction of acclimation pond at existing release site (Hells Canyon) or new acclimation/release site
#38	<b>Is the release strategy appropriate for the program?</b>  See PM #22c		4			Discussion	

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

<b>PM #</b>	<b>Description of Performance Measure</b>	<b>Compliance Status</b>	<b>Basis for Compliance or Non-Compliance</b>	<b>Remedial Action Needed for Compliance</b>
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Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No	
#39	<b>For new programs, has a broodstock collection plan been developed?</b>					
	Is the broodstock collection plan written?					
	For a non-captive broodstock program:					
	Was an unbiased, representative sample collected?					
	Was the recommended number of broodstock collected?					
	For a captive broodstock program:					
	Were captive brood progeny excluded as donors for propagating the next					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
		4				Existing program, does not apply	
		4				ò	
		4				ò	
		4					

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No		
#40	<b>For a new program, was the donor selection outline followed in selecting the hatchery broodstock?</b>						
	Is a donor selection plan written?						
	Was the donor selection outline followed in the selecting the broodstock?	4				Existing program, does not apply	
	Was the target stock recommended in the donor selection process actually used?	4				Ò	
		4				Ò	

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No	
#41	<b>For existing programs, were the broodstock collection procedures followed?</b>					
	Is the broodstock collection plan written?					
	Does the broodstock collection plan follow the guideline:					
	Was an unbiased, representative sample collected?					
	Was the recommended number of broodstock collected?					
	Were the broodstock collection procedures in hatchery operation plan understood and followed?					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
			4			Review of plan	
			4			Discussion	
			4			Discussion	
			4			Discussion	



**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No	
#42	<b>Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?</b>					
	Are the spawning protocols written?					
	Are daily or weekly spawning logs available?					
	Were the appropriate number of spawners used?					
	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?					
	Was the sex-ratio within the limits given in the performance standards?					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

		N/A	Yes	?	No		
			4			Review of plan	
			4			Review of records	
			4			Review of records	
			4			Discussion	
			4			Review of records/Discussion	

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No	
#43	<p><b>Is there a genetics monitoring and evaluation program in place?</b></p> <p>Is a genetics monitoring and evaluation program available?</p> <p>Does the plan address the following elements listed in IHOT:</p> <p>Does the program have elements needed to meet evaluation goals 1-4?</p> <p>Has a qualified geneticist reviewed and endorsed the program (goal 5)?</p> <p>Will the program collect the data and maintain the records needed to evaluate</p>					

Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures

		N/A	Yes	?	No		
					4	No plan supplied to inspection team	Develop plan for IHOT Operations Plan
		4					
		4					
		4					

**Table 1 Rapid River Hatchery Compliance (Spring Chinook) With Performance Measures**

## Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control to those that require a change in agency policy or procedures to those that have a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

### The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or PM not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but not clearly definable at this time

## Remedial Actions at Rapid River Hatchery (Spring Chinook)

This section presents the corrective actions required to bring the Rapid River Hatchery Spring Chinook program into compliance with the IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 2).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ( $\pm 40\%$ ).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

**Table 2. Remedial Actions Required at Rapid River Hatchery (Spring Chinook)**

Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 1</b> - Non-compliance issues resulting from items beyond human control or PM		
not relevant for this hatchery		
Need improved adult returns (the hatchery has not been meeting its egg take goal, smolt release goal, or smolt-to-adult goal)	---	4c,4g, 4h,22a4
Security alarms and telephone pagers	---	6



Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures		
Prepare hatchery monitoring and evaluation plan	---	3
Review water temperature criteria	---	5a
Increase water rights for hatchery	---	5b
Regional quality control officer to evaluate feeds	---	12
Develop specific rearing criteria for feeding training in outdoor raceways		19
Improve coordination with NMFS to reduce delays in release due to ESA permit issues	---	22a5

Remedial Action Required	Cost	PMs <sup>1</sup>
Increase in frequency of routine fish health examinations	---	21,26
Disinfection of fish transport cab	---	23
Reduction of DO to 8 ppm in transport after systems are functioning properly	---	23
Development of smoltification goal	---	22a1
Better communication between research group and hatchery; may need additional personnel	---	24
Install foot baths	---	28
Develop genetics monitoring and evaluation plan	---	43
<b>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</b>		
Run analysis for carbon dioxide, iron and zinc	\$100	5c

Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Improvements to adult holding and crowding systems		4b,7
Pond #1 Crowder, spray system, relocation of fence	\$80,000	
Pond #2 Concrete lining, piping, screening	\$150,000	
Pond #2 Crowder, spray system	\$120,000	
Rebuild intake to meet current criteria and replace piping to increase flow to Pond #2		5b,10
Construct new intake	\$250,000	
Manually operated gate at intake	\$10,000	
Rail crane for dam	\$50,000	
Rebuild dam (optional)	\$250,000	
Install 1,000 ft of new 36" pipe	\$150,000	
Install 400 ft of new 24" pipe	\$30,000	
Water treatment for incubation and early rearing		5d,5h,8,28
Pumps and sand filtration for incubation (500 gpm)	\$70,000	
Ozone disinfection for incubation & early rearing (2,300 gpm) (Optional)	\$200,000	

Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but not clearly definable at this time		
Flow and density criteria <u>slightly</u> over standards during some time of year. Could require more rearing space and water flow, but should be studied carefully.	—	19
Iron and zinc concentrations are greater than the criteria	—	5c
Development of groundwater supply for incubation and early rearing	—	5d,5h
Construction of acclimation pond at existing release site (Hells Canyon) or new acclimation/release site	—	22b

## Hatchery Contribution to Fisheries, Spawning Grounds and Hatcheries

This section presents the audit findings for the Rapid River Hatchery (Spring Chinook) contribution of adult fish to fisheries, local fisheries, spawning grounds and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2, 3, 4, 5, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4-5 years after the fish have been released from the hatchery.

**Table 3. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries -  
Rapid River Hatchery (Spring Chinook)**

<b>Year</b>	<b>Fisheries</b>	<b>Spawning Grounds<sup>3</sup></b>	<b>Hatchery<sup>3</sup></b>	<b>Smolt to Adult Survival (percent)</b>
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Data obtained from Missing Production Groups Annual Reports or from the Regional Mark Information System database.

	(Broodyear)	(Broodyear)	(Broodyear)	
1981				
1982				
1983				
1984				
1985	216	----	941	0.041
1986	953	----	2,115	0.116
1987	444	----	555	0.043
1988	1,247	----	114	0.054
1989	487	----	0	0.024
1990				
1991				
1992				

## Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the Federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program were estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 4 shows the annual operating expenses for the Rapid River Hatchery (Spring Chinook).

**Table 4. Annual Operating Expenses - Rapid River Hatchery (Spring Chinook)**

Component	1993	1994	1995
Personnel Costs <sup>4</sup>	\$152,261	\$165,939	\$84,537
Operational Costs	\$68,126	\$71,276	\$26,894
Capital Costs <sup>4</sup>	\$1,170	\$1,131	\$1,300
Indirect Costs <sup>4</sup>	\$50,245	\$4,3167	\$18,494
Lumped Hatchery Costs			

Includes estimated electrical costs of \$12,000/year

If it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Lumped Third Party Costs <sup>5</sup>	\$292,960	\$447,953	\$139,056
<b>Total Hatchery Costs</b>	<b>\$564,763</b>	<b>\$729,466</b>	<b>\$386,608</b>
<b>Source of Funds</b>			
Idaho Power	100%	100%	100%
Program Production (lb)	---	---	---
Total Production (lb)	---	---	---
Program as Percent of Total	100%	100%	100%
<b>Program Costs</b>	<b>\$564,763</b>	<b>\$729,466</b>	<b>\$386,608</b>

PMs are Performance Measures that were extracted from the IHOT 1995 report. The IHOT Performance Measures are listed in Table 1 in Section 3 in numerical order.